AMENDMENT UNDER 37 C.F.R. § 1.111
U.S. Application No.: 10/642,572

AMENDMENTS TO THE SPECIFICATION

Please replace the present title with the following amended title:

~~RESONATOR~~RESONATOR FOR USE IN ELECTRONIC ARTICLE SURVEILLANCE SYSTEMS

Please replace the first full paragraph on page 1 at lines 4-6 with the following new paragraph:

The present invention relates to a resonator for use in a marker in an electronic article surveillance system constituted by an amorphous alloy ribbon for use in article surveillance systems, etc. utilizing magnetostriction vibration.

Please replace the paragraph bridging pages 2 and 3 with the following new paragraph:

As a method for improving properties necessary for the resonator for use in a marker in an electronic article surveillance system, that is, the intensity and attenuation time of a signal output generated by an AC magnetic field, for instance, U.S. Patent 6,011,475 discloses a heat treatment of an amorphous alloy ribbon in a magnetic field having a predetermined angle to a surface of the amorphous alloy ribbon.

Please replace the second full paragraph on page 3 at lines 9-11 with the following new paragraph:

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Accordingly, an object of the present invention is to provide a resonator for use in a marker in an electronic article surveillance system constituted by an amorphous alloy ribbon having improved output characteristics.

Please replace the third full paragraph on page 3 at lines 14-18 with the following new paragraph:

As a result of intense research in view of the above object, the inventors have found that a resonator for use in a marker in an electronic article surveillance system having a proper thickness makes it possible to increase output signals while reducing the unevenness of the output signals. The present invention has been completed based on this finding.

Please replace the fourth full paragraph on page 3 at lines 19-22 with the following new paragraph:

Thus, the resonator of the present invention is ~~constituted by~~ comprises an amorphous alloy ribbon having a width of 7 mm or less and a thickness of 18μm to 23 μm. To fully exhibit the effect of the present invention, the resonator preferably has an average surface roughness Ra of 0.45 μm or less.

Please replace the first full paragraph on page 4 at lines 2/3 with the following new paragraph:

Fig. 3 is a graph showing the relations between the thickness of an amorphous alloy ribbon and output signals A_0, A_1 of a resonator for use in a marker in an electronic article surveillance system;

Please replace the third full paragraph on page 4 at lines 6/7 with the following new paragraph:

Fig. 5 is a graph showing the relations between the surface roughness of an amorphous alloy ribbon and output signals A_0, A_1 of a resonator for use in a marker in an electronic article surveillance system; and

Please replace the fifth full paragraph on page 4 at lines 12-19 with the following new paragraph:

The present invention provides a resonator for use in a marker in an electronic article surveillance system with an increased output signal by a different means from those conventional. In the conventional technologies, an output signal from a resonator during the operation of a transmitter is increased by reducing eddy current losses with reduced magnetic domain width. In the present invention, on the other hand, an output signal from a resonator after stopping a transmitter is increased by optimizing the shape of an amorphous alloy ribbon. The present invention will be explained in detail below.

Please replace the paragraph bridging pages 4 and 5 with the following new paragraph:

In addition to the technology described in U.S. Patent 6,011,475, an effective way for increasing an output signal from a resonator for use in a marker in an electronic article surveillance system during the operation of a transmitter has been considered to increase the thickness of an amorphous alloy ribbon to such an extent that a crystal phase is not remarkably generated in the ribbon by reducing the cooling speed of the ribbon during its casting. This is

based on the confirmed theory that the more the cross-sectional area of a resonator (amorphous alloy) in a width direction thereof, the larger its output signal. Resonators as small as 7 mm or less in width are recently used to reduce the size of article surveillance systems, and such narrow resonators use thick amorphous alloy ribbons to have large cross-sectional areas. As a result, amorphous alloy ribbons having a thickness of 25 μm or more are widely used in presently available resonators as narrow as 7 mm or less.

Please replace the first full paragraph on page 5 at lines 11-25 with the following new paragraph:

On the contrary, the present invention is based on the finding that excellent output characteristics can be obtained by using an amorphous alloy ribbon having a thickness of 18μm to 23 μm, thinner than the conventional ribbon, in a resonator having a width of 7 mm or less. Because the amorphous alloy ribbon used in the resonator of the present invention having a width of 7 mm or less is as thin as 18 to 23 μm, an output signal emitted from the resonator during the operation of a transmitter is smaller than those from the conventional resonators. With respect to the level of an output signal emitted from the resonator after the stop of a transmitter, however, the resonator comprising an amorphous alloy ribbon having a thickness of 18μm to 23 μm is higher than the conventional resonators comprising amorphous alloy ribbons thicker than 23 μm. Actually received from a resonator used in a marker in an electronic article surveillance ~~systems~~ system, etc., is an output signal emitted after the stop of a transmitter. Accordingly, the resonator of the present invention practically provides higher output signals.

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Please replace the second full paragraph on page 5 at lines 26-28 with the following new paragraph:

Experiments by the inventors have proved that the resonator for use in a marker in an electronic article surveillance system of the present invention provides an increased output signal with reduced unevenness.

Please replace the first full paragraph on page 7 at line 3-9 with the following new paragraph:

The amorphous alloy ribbon preferably has an average surface roughness Ra of 0.45 μm or less. When the amorphous alloy ribbon is used as a resonator for use in a marker in an electronic article surveillance system, a heat treatment is carried out in a magnetic field as proposed by U.S. Patent 6,011,475. With respect to the heat treatment in a magnetic field, various methods utilizing different directions of magnetic fields are proposed. All of such methods are used to provide amorphous alloy ribbons with magnetic anisotropy.

Please replace the second full paragraph on page 15 at lines 9/10 with the following new paragraph:

The resonator for use in a marker in an electronic article surveillance system of the present invention using an amorphous alloy ribbon having a proper thickness can provide a higher output signal.

Please delete the present Abstract of the Disclosure and add the following new Abstract of the Disclosure:

A resonator for use in a marker in an electronic article surveillance system having ~~constituted by~~ an amorphous alloy ribbon having a width of 7 mm or less and a thickness of 18μm to 23 μm. The amorphous alloy ribbon preferably has an average surface roughness Ra of 0.45 μm or less.